

REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 53-82 are presented for consideration. Claims 53, 54, 57-59 and 82 are independent. Claim 52 has been canceled without prejudice or disclaimer. Claims 53, 54, 57-59 and 82 have been amended to clarify features of the subject invention. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant request favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 52-54 and 59-82 were rejected under 35 U.S.C. § 103 as being unpatentable over Japanese patent document number JP-405217837 to Nishida et al. Claims 55-58 were rejected under 35 U.S.C. § 103 as being unpatentable over the Nishida et al. patent in view of U.S. Patent No. 5,243,377 to Umatate. Applicants submit that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as previously recited in independent claims 52-54, 57-59 and 82. Therefore, these rejections is respectfully traversed. Nevertheless, Applicants submit that independent claims 53, 54, 57-59 and 82, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the present invention, independent claim 53 recites an exposure apparatus that includes a reticle stage and/or a wafer stage, a stage apparatus having a stage movable at least on a long stroke along a first direction and a short stroke along a second direction, a first optical unit which is arranged outside the stage and splits a first laser beam for

measuring a position of the stage in the first direction into first reference and measurement beams, a second optical unit which splits a second laser beam for measuring a position of the stage in the second direction into second reference and measurement beams, a third optical unit which is arranged on the stage and irradiates a third laser beam along a third direction for measuring a position of the stage in the third direction perpendicular to each of the first and second directions, a first reflection unit which is arranged on the stage and reflects the first measurement beam, a second reflection unit which is arranged outside the stage and reflects the second measurement beam, a first detector which is arranged outside the stage and detects an interference beam of the first measurement and reference beams, and a second detector which is arranged outside the stage and detects an interference beam of the second measurement and reference beams.

In another aspect of the present invention, independent claim 54 recites a semiconductor device manufacturing method that includes the steps of installing, in a semiconductor manufacturing factory, manufacturing apparatuses for performing various processes, the manufacturing apparatuses includes an exposure apparatus which includes as a reticle stage and/or a wafer stage, a stage apparatus having a stage movable at least in a long stroke along a first direction and a short stroke along a second direction, a first optical unit which is arranged outside the stage and splits a first laser beam for measuring a position of the stage in the first direction into first reference and measurement beams, a second optical unit which splits a second laser beam for measuring a position of the stage in the second direction into second reference and measurement beams, a third optical unit which is arranged on the stage and irradiates a third laser

beam along a third direction for measuring a position of the stage in the third direction perpendicular to each of the first and second directions, a first reflection unit which is arranged on the stage and reflects the first measurement beam, a second reflection unit which is arranged outside the stage and reflects the second measurement beam, a first detector which is arranged outside the stage and detects an interference beam of the first measurement and reference beams, and a second detector which is arranged outside the stage and detects an interference beam of the second measurement and reference beams.

In a further aspect of the present invention, independent claim 57 recites a semiconductor manufacturing factory that includes manufacturing apparatuses, for performing various processes, the manufacturing apparatuses include an exposure apparatus which includes as a reticle stage and/or a wafer stage a stage apparatus having a stage movable at least in a long stroke along a first direction and a short stroke along a second direction, a first optical unit which is arranged outside the stage and splits a first laser beam for measuring a position of the stage in the first direction into first reference and measurement beams, a second optical unit which splits a second laser beam for measuring a position of the stage in the second direction into second reference and measurement beams, a third optical unit which is arranged on the stage and irradiates a third laser beam along a third direction for measuring a position of the stage in the third direction perpendicular to each of the first and second directions, a first reflection unit which is arranged on the stage and reflects the first measurement beam, a second reflection unit which is arranged outside the stage and reflects the second measurement beam, a first detector which is arranged outside the stage and detects an interference beam of the first measurement and

reference beams, and a second detector which is arranged outside the stage and detects an interference beam of the second measurement and reference beams, a local area network for connecting the manufacturing apparatuses, and a gateway which allows the local area network to access an external network outside the factory. The information about at least one of the manufacturing apparatuses can be communicated.

In yet another aspect of the present invention, independent claim 58 recites a maintenance method for an exposure apparatus which is installed in a semiconductor manufacturing factory, and includes as a reticle stage and/or a wafer stage a stage apparatus having a stage movable at least in a long stroke along a first direction and a short stroke along a second direction, a first optical unit which is arranged outside the stage and splits a first laser beam for measuring a position of the stage in the first direction into first reference and measurement beams, a second optical unit which splits a second laser beam for measuring a position of the stage in the second direction into second reference and measurement beams, a third optical unit which is arranged on the stage and irradiates a third laser beam along a third direction for measuring a position of the stage in the third direction perpendicular to each of the first and second directions, a first reflection unit which is arranged on the stage and reflects the first measurement beam, a second reflection unit which is arranged outside the stage and reflects the second measurement beam, a first detector which is arranged outside the stage and detects an interference beam of the first measurement and reference beams, and a second detector which is arranged outside the stage and detects an interference beam of the second measurement and reference beams. The method includes the steps of causing a vendor or user of the exposure apparatus to provide a maintenance

database connected to an external network of the semiconductor manufacturing factory, authorizing access from the semiconductor manufacturing factory to the maintenance database via the external network, and transmitting maintenance information accumulated in the maintenance database to the semiconductor manufacturing factory via the external network.

In a still further aspect of the present invention, independent claim 59 recites a stage apparatus that includes a stage movable along at least a first direction and a second direction, wherein the stage is movable in a stroke along the first direction, which is longer than a stroke in the second direction, a first optical unit which is arranged outside the stage and splits a first laser beam for measuring a position of the stage in the first direction into first reference and measurement beams, a second optical unit which splits a second laser beam for measuring a position of the stage in the second direction into second reference and measurement beams, a third optical unit which is arranged on the stage and irradiates a third laser beam along a third direction for measuring a position of the stage in the third direction perpendicular to each of the first and second directions, and an interferometer which measures a position of the stage, wherein the interferometer has a first reflection unit which is arranged on the stage and measures the stage in the first direction and a second reflection unit which is arranged outside the stage and measures the stage in the second direction.

In still another aspect of the present invention, independent claim 82 recites a stage apparatus that includes a stage movable at least in a long stroke along a first direction and a short stroke along a second direction, and an interferometer which measures a position of the stage, wherein the interferometer has a first reflection unit which is arranged on the stage and measures

the stage in the first direction, a second reflection unit which is arranged outside the stage and measures the stage in the second direction and a third reflection unit which is arranged outside the stage and measures the stage in the third direction perpendicular to each of the first and second directions.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 53, 54, 57-59 and 82.

The Examiner relies on the Nishida et al. document for disclosing a stage apparatus and a corresponding method, which includes a stage movable in at least a long stroke along a first direction and a short stroke along a second direction (X and Y directions), a laser/interferometer for generating a laser beam, a first reflecting unit arranged on the stage for measuring in a first direction and a second reflecting unit for measuring the stage in a second direction (that is, the Y direction). The Examiner further states that the Nishida et al. document teaches a first optical unit arranged outside the stage, which splits a first laser beam for measuring a position of the stage in a first direction, into first reference and measuring beams, and a second optical unit which splits a second laser beam for measuring a position of the stage in a second direction, into second reference and measuring beams, with the second optical unit being arranged outside of the stage.

Applicants submit, however, that the Nishida et al. document does not teach or suggest at least the arrangement of the first, second and third optical units of the present invention, as recited in independent claims 53, 54 and 57-59, or the arrangement of the first, second and third reflection units of the present invention, as recited in independent claim 82. Accordingly, the

Nishida et al. document does not teach many features of the present invention, as recited in the independent claims.

Applicants further submit that the remaining art cited does not cure the deficiencies noted above with respect to the Nishida et al. document.

The Examiner relies on the Umatate et al. patent for disclosing a plural exposure apparatus and a host management system, a network interface, and a computer, with information relating to each of the exposure apparatuses being communicated by a computer network.

Applicants submit, however, that the Umatate patent, as with the Nishida et al. document, does not teach or suggest at least the arrangement of the first, second and third optical units of the present invention recited in independent claims 53, 54 and 57-59, or the arrangement of the first, second and third reflection units of the present invention recited in independent claim 82.

Accordingly, Applicants further submit that the Umatate patent adds nothing to the teachings of the Nishida et al. document that would render obvious Applicants' present invention, as recited in the independent claims.

For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 53, 54, 57-59 and 82, is patentably defined over the cited art.

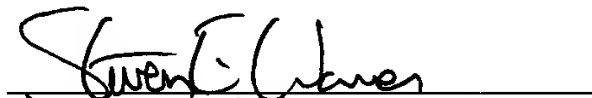
Dependent claims 55, 56 and 60-81 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that this Amendment After Final Rejection clearly places this application in condition for allowance. This Amendment was not earlier presented because Applicants believed that the prior Amendment placed the application in condition for allowance. Accordingly, entry of the instant Amendment, as an earnest attempt to advance prosecution and reduce the number of issues, is requested under 37 CFR 1.116.

Favorable reconsideration, withdrawal of the rejections as set forth in the above-noted Office Action and an early Notice of Allowance are also requested.

Applicants' attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



Attorney for Applicants
Steven E. Warner
Registration No. 33,326

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200